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ABSTRACT

This document, which is designed for use in developing a tech prep competency profile for the occupation of medical laboratory technician, lists technical competencies and competency builders for 18 units pertinent to the health technologies cluster in general and 8 units specific to the occupation of medical laboratory technician. The following skill areas are covered in the general units: employability; professionalism; teamwork; computer literacy; documentation; infection control and risk management; medical terminology; anatomy, physiology, and pathology; medical law and ethics; psychology of stress; psychology of human relations; first aid and medical emergencies; general administrative duties; vital signs; nutrition; basic pharmacology; patient education; and laboratory tests and diagnostic procedures. The 8 units specific to the occupation of medical laboratory technician list a total of 88 competencies in the following areas: clinical chemistry; immunohematology; immunology and serology; bacteriology; parasitology; urinalysis; hematology; and phlebotomy. (MN)

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ED 387 689

# TECH PREP

"GET SERIOUS . . . ABOUT SUCCESS"

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# Medical Laboratory Technician

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# Medical Laboratory Technician

**NOTE: Each TCP should respond to labor market demands in your area. Therefore, the following pages should be examined before being selected for use in TCP Part I (See "The TCP Process" Tab). For example, some units may not apply to your situation, nor might all the competencies within each unit be appropriate. Also, note that several units appear within each of the twelve occupations in this binder. Those "common" units should only appear once in the draft competency list for TCP Part I if you are compiling several occupations in a cluster format (See "TCP Matrix" Tab).**


| Units to Consider: | Page |
|---|---|
| Employability Skills | MLT-3 |
| Professionalism | MLT-8 |
| Teamwork | MLT-12 |
| Computer Literacy | MLT-14 |
| Documentation | MLT-15 |
| Infection Control and Risk Management | MLT-16 |
| Medical Terminology | MLT-23 |
| Anatomy, Physiology, and Pathology | MLT-24 |
| Medical Law and Ethics | MLT-31 |
| Psychology of Stress | MLT-33 |
| Psychology of Human Relations | MLT-35 |
| First Aid and Medical Emergencies | MLT-38 |
| General Administrative Duties | MLT-40 |
| Vital Signs | MLT-46 |
| Nutrition | MLT-49 |
| Basic Pharmacology | MLT-51 |
| Patient Education | MLT-53 |
| Laboratory Tests and Diagnostic Procedures | MLT-55 |
| Clinical Chemistry | MLT-61 |
| Immunohematology | MLT-69 |
| Immmunology and Serology | MLT-74 |
| Bacteriology | MLT-77 |
| Parasitology | MLT-82 |
| Urinanalysis | MLT-84 |
| Hematology | MLT-87 |
| Phlebotomy | MLT-92 |

**DON'T FORGET TO INSERT YOUR ACADEMIC COMPETENCIES HERE**

**Communications Literacy, Mathematics Literacy, Science Literacy, and Technology Literacy have been removed so that you may insert your own academic lists here.**

## COMMUNICATIONS LITERACY

**(e.g., Reading, Writing, Speaking, and Listening)**

## MATHEMATICS LITERACY

**(e.g., Algebra, Geometry, Trigonometry, Calculus)**

## SCIENCE LITERACY

**(e.g., Physical Science, Environmental Science, Agriscience, Biology, Chemistry, Physics, Anatomy & Physiology)**

## TECHNOLOGY LITERACY

**(i.e., the impact of technology on humans and their home, work, and play environments)**

# Unit: Employability Skills

**Competency: Develop a career plan**

**Competency Builders:**

Identify current interests and aptitudes
Identify common barriers to employment
Describe strategies to overcome employment barriers
Locate resources for finding employment
Research job trends
Identify career options
Identify advantages and disadvantages of career options (in addition to other than monetary)
Identify job requirements
Investigate education/training opportunities
Evaluate personal strengths and weaknesses

**Competency: Prepare for employment**

**Competency Builders:**

Identify traditional and non-traditional employment sources
Identify present and future employment opportunities (by geographic location)
Research job opportunities, including non-traditional careers
Compare salary ranges and benefit packages
Compile occupational profile
Identify rights and responsibilities of equal employment opportunity laws
Design resume and cover letter
Target resume
Secure references
Investigate generic and specific employment tests (e.g., civil service exam; drug screening)
Use follow-up techniques to enhance employment potential
Demonstrate legible written communication skills using correct grammar, spelling, punctuation, and concise wording
Describe methods for handling illegal questions on job application forms and during interviews
Write letter of application
Research prospective employer and services performed
Explain critical importance of personal appearance, hygiene, and demeanor
Interpret job description
Demonstrate appropriate interview question and answer techniques
Demonstrate methods for handling difficult interview questions
Evaluate job offers
Write letter of acceptance
Write letter of declination
Demonstrate good listening skills
Ask for the job tactfully
Participate in extracurricular activities (e.g., student government, community projects,)

**Competency: Evaluate the importance of self-esteem as an employability skill**

**Competency Builders:**

Identify factors that affect self-esteem
Compare effects of low self-esteem and high self-esteem
Identify strategies to promote positive self-esteem

**Competency: Demonstrate job retention skills**

**Competency Builders:**

Identify employer expectations regarding job performance, work habits, attitudes, personal appearance, and hygiene
Exhibit appropriate work habits and attitude
Demonstrate ability to set priorities
Identify behaviors to establish successful working relationships
Identify alternatives for dealing with harassment, bias, and discrimination based on race, color, national origin, sex, religion, handicap, or age
Identify opportunities for advancement
List reasons for termination
List consequences of being absent frequently from job
List consequences of frequently arriving late for work
Demonstrate interpersonal relations skills (i.e., verbal and written)
Demonstrate negotiation skills
Demonstrate teamwork
Follow chain-of-command
Exhibit appropriate job dedication

**Competency: Demonstrate knowledge of work ethic**

**Competency Builders:**

Define work ethic
Identify factors that influence work ethic
Differentiate law and ethics
Describe how personal values are reflected in work ethic
Describe how interactions in the workplace affect personal work ethic
Describe how life changes affect personal work ethic

**Competency: Exhibit appropriate work ethic**

**Competency Builders:**

Use time-management techniques
Avoid personal activity during work hours
Attend work as scheduled
Adhere to company and/or governmental policies, procedures, rules, and regulations
Exercise confidentiality
Demonstrate appropriate human relations skills
Adhere to rules of conduct
Accept constructive criticism
Offer constructive criticism
Take pride in work
Resolve conflict
Manage stress
Avoid sexual connotations and harassment
Adjust to changes in the workplace
Demonstrate punctuality
Assume responsibility for personal decisions and actions
Take responsibility for assignments
Follow chain-of-command

**Competency: Apply decision-making techniques**

**Competency Builders:**

Identify decision to be made
Identify ownership of decision to be made
Identify possible alternatives and their consequences
Make decisions based on facts, legality, ethics, goals, and/or culture
Apply time factor(s)
Present decision to be implemented
Evaluate decision made
Take responsibility for decision

**Competency: Apply problem-solving techniques**

**Competency Builders:**

Identify problem
Select appropriate problem solving tools/techniques
Identify root problem cause(s)
Track root problem cause(s)
Identify possible solutions and their consequences (e.g., long term, short term, crisis)
Use resources to explore possible solutions to problem
Contrast advantages and disadvantages of each solution
Identify appropriate action
Evaluate results
Identify post-preventive action

**Competency: Exhibit characteristics for job advancement**

**Competency Builders:**

Display positive attitude
Demonstrate knowledge of position
Perform quality work
Adapt to changing situations and technology
Demonstrate capability/responsibility for different positions
Identify characteristics of effective leaders
Identify opportunities for leadership in work place/community
Demonstrate initiative to affect change in workplace
Participate in continuing education/training program
Responds appropriately to criticism from employer, supervisor, or other employees
Exhibit awareness of corporate culture
Prepare for job setbacks
Exhibit continual growth based on performance evaluation
Set realistic goals

# Unit: Professionalism

## Competency: Project professional image

### Competency Builders:

Define professionalism
Exhibit professional appearance
Exhibit professional manners
Project professional attitude
Identify individuals' vital role in organization
Exhibit proper etiquette in professionally-related situations

## Competency: Achieve individual and professional goals

### Competency Builders:

Set flexible, realistic, and measurable goals
Identify potential barriers to achieving goals
Identify strategies for addressing barriers to goal achievement
Breakdown long-term goals into short-term goals
Prioritize goals
Commit to goals
Adjust goals
Obtain support for goals
Reward goal achievement

## Competency: Manage personal finances

### Competency Builders:

Explain need for personal management records
Balance checkbook
Identify tax obligations
Analyze how credit affects financial security
Compare types and methods of investments
Compare types and methods of borrowing
Compare types and methods of insurance
Compare types of retirement options/plans
Identify discriminatory vs. non-discriminatory expenditures

**Competency: Support community well-being**

**Competency Builders:**

Identify environmental, educational, and social issues
Participate in social and/or community activities

**Competency: Achieve organizational goals**

**Competency Builders:**

Evaluate personal goals in relation to organizational goals
Monitor progress by evaluating feedback
List responsibilities in relation to organization goals
Accomplish assigned tasks
Exercise responsibility in relation to organizational goals
Set appropriate personal performance standards
Communicate goals with supervisor and peers
Demonstrate knowledge of products and services
Promote organizational image and mission

**Competency: Demonstrate positive relations in the workplace**

**Competency Builders:**

Identify personality types of self and other
Identify various management styles
Support employer expectations
Support employer decisions
Accept constructive criticism
Give constructive feedback
Adapt to changes in workplace
List factors to consider before resigning
Write letter of resignation

**Competency: Manage stressful situations**

**Competency Builders:**

Accept stress as part of daily life
Identify personal and professional factors contributing to stress
Describe physical and emotional responses to stress
Evaluate positive and negative effects of stress on productivity
Identify strategies for reducing stress
Implement strategies to manage stress
Create strategies for developing and maintaining support systems

**Competency: Analyze effects of family on work and work on family**

**Competency Builders:**

Identify how family values, goals, and priorities are reflected in work place
Identify responsibilities and rewards associated with paid and non-paid work
Identify responsibilities and rewards associated with families
Explain how family responsibilities can conflict with work
Explain how work can conflict with family responsibilities
Explain how work-related stress can affect families
Explain how family-related stress can affect work
Identify family support systems and resources
Identify work-related support systems and resources
Communicate with family regarding work

**Competency: Apply lifelong learning skills**

**Competency Builders:**

Define lifelong learning
Identify factors that cause need for lifelong learning
Analyze effects of change
Identify reasons why goals change
Describe importance of flexibility and adaptability
Evaluate need for continuing education/training

**Competency: Manage professional development**

**Competency Builders:**

Identify career opportunities
Modify career plan
Participate in continuing education/training opportunities
Document continuing education/training
Read profession-related manuals, technical journals, and periodicals
Attend meetings, workshops, seminars, conferences, and demonstrations
Participate in professional organizations
Build personal/professional mentor relationship
Build personal/professional support system
Build professional network
Strengthen communication skills
Strengthen leadership skills
Strengthen management skills

# Unit: Teamwork

**Competency: Demonstrate knowledge of teamwork**

**Competency Builders:**

Define empowerment
Differentiate work groups and teams
Identify conditions essential to teamwork (e.g., brainstorming)
Explain influence of culture (e.g., corporate, community) on teamwork
Identify appropriate situations for using teams
Define team structures (e.g., cross functional, quality improvement, task force, quality circles)
Identify team building concepts
Describe characteristics and dynamics of teams
Identify characteristics of effective team leaders and members
Identify responsibilities of a valuable team member
Identify methods of involving each member of a team
Explain how individuals from various backgrounds contribute to work-related situations (e.g., technical training, cultural heritage)
Explain the purpose of facilitators
Define consensus
Define reward/recognition system

**Competency: Demonstrate teamwork**

**Competency Builders:**

Identify purpose of team and intended goal (include time frames)
Structure team around purpose
Define responsibilities of team members
Contribute to efficiency and success of team
Work toward individual and team milestones
Analyze results of team project
Facilitate a team meeting
Assist team member(s) with problem
Monitor time frame
Stress continuous improvement
Accept failure as part of learning

**Competency: Use teamwork to solve problems**

**Competency Builders:**

Identify appropriate situations for using teams
Use problem-solving process in a team setting
Identify quality management processes/techniques
Identify quality assurance processes/techniques
Prepare presentation

**Competency: Conduct team meetings**

**Competency Builders:**

Plan agenda
Schedule meeting and location
Invite appropriate personnel
Solicit outside speakers as needed
Assign someone to take minutes
Facilitate introductions
Invite questions and comments and group participation
Focus team on agenda items
Assign appropriate action, time frame and accountability to tasks
Monitor time
Close meeting on time
Publish minutes in timely manner
Set ground rules
Avoid placing individual agendas above the group's agenda

# Unit: Computer Literacy

**Competency: Describe personal computer operations**

**Competency Builders:**

Explain how data is stored in main computer memory
Explain how computer system executes program instruction
Explain computer storage capacity
Explain how data is represented
Describe data storage techniques
Identify types of memory

**Competency: Operate computer hardware**

**Competency Builders:**

Practice proper media handling techniques
Identify hardware and its use
Use hardware (e.g., mouse, modems, touch screen, printers, digitizers, scanners)
Keyboard efficiently
Demonstrate basic care of hardware
Explain need for and application of security levels/procedures

**Competency: Use software**

**Competency Builders:**

Define software types and functions
Perform functions necessary to operate software
List advantages and disadvantages of integrated and dedicated software
Operate system software
Demonstrate basic use of spreadsheets
Demonstrate word processing skills
Demonstrate basic use of databases
Demonstrate system commands
Apply security levels/procedures while handling sensitive data

# Unit: Documentation

**Competency: Demonstrate proficiency in technical documentation**

**Competency Builders:**

Record data
Maintain test logs
Compile cumulative reference notebook/record

**Competency: Demonstrate proficiency in technical report writing**

**Competency Builders:**

Write out procedures
Design charts and graphs
Outline reports
Write reports
Present resports
Complete equipment failure reports
Compose technical letters and memoranda
Write formal reports
Demonstrate ability to use cross reference/technical manuals

# Unit: Infection Control and Risk Management

**Competency: Comply with local, state, and federal regulations**

**Competency Builders:**

Explain state and federal governmental roles in universal precautions as outlined by the Centers for Disease control (CDC)
Comply with Occupational Safety and Health Administration (OSHA) regulations
Explain purpose of Material Safety Data Sheets (MSDS)
Comply with Environmental Protection Agency (EPA) regulations
Report communicable diseases to local health authorities
Use precautions to prevent contamination
Demonstrate use of fire and safety equipment
Correct safety hazards
Write incident reports for accidents or safety infractions

**Competency: Comply with environmental safety standards, accident prevention methods, and disaster plans**

**Competency Builders:**

Observe environmental safety rules of facility
Identify potential hazardous situations
Explain universal precautions to transmission of infectious diseases (e.g., HIV/AIDS, hepatitis)
Identify fire prevention methods, fire control, fire alarm systems, and fire reporting procedures
Demonstrate use of fire extinguisher
Identify facility disaster plan
Demonstrate safety precautions for using equipment
Demonstrate safety precautions for using liquids and poisonous substances
Conduct safety inspection of client area
Correct safety hazards (e.g., spills)
Complete incident reports for accidents or safety infractions
Identify legal implications of accidents in health care facility
Explain potential sources of hazards, (e.g., fire, electrical, chemical, biological, radioactive)
Follow procedures for hazardous situations (e.g., eye and face wash, shower, fire extinguishers)
Store materials properly
Label materials properly
Follow manufacturer's instructions for safe operation of all equipment and instruments

**Competency: Maintain personal safety and hygiene**

**Competency Builders:**

Use universal precautions
Demonstrate isolation techniques
Wash hands aseptically
Use eye/faceshield protection
Wear gloves
Wear mask
Wear uniform or professional attire
Apply principles of aseptic techniques and sterility
Practice proper hygiene
Immunize self against communicable diseases
Complete incident reports as required
Demonstrate proper body mechanics
Demonstrate safe and effective sterilizing methods for instruments and equipment
Demonstrate safe and effective use of safety equipment
Identify at-risk behaviors which promote the spread of HIV/AIDS and/or hepatitis
Differentiate fact from fallacy regarding the transmission of HIV/AIDS and hepatitis
Identify principles of ergonomics
Identify common causes of back injuries
Demonstrate proper body mechanics involved in lifting, moving, transferring, ambulating, and positioning patient

**Competency: Maintain infection control of work area**

**Competency Builders:**

Identify modes of transmission of infection
Identify methods for preventing infection transmission
Differentiate between bacteriostatic and bacterialcidal
Identify disinfection techniques
Define "nosocomial infection"
Identify terms related to cleaning and disinfecting
Outline measures to be taken to clean and disinfect
Outline flow of dirty equipment and materials
Contain used linens
Isolate contaminated linens
Clean work areas
Disinfect work areas

**Competency: Apply aseptic and sterilizing principles**

**Competency Builders:**

Read and follow manufacturer's instructions for safe operation of all equipment and instruments
Maintain infection control
Prescrub instruments
Disinfect instruments
Sterilize instruments
Operate sterilizing equipment
Store sterilized equipment and supplies
Maintain quality-control log
Define asepsis
Identify methods for sterilizing and disinfecting reusable equipment
Define spore strip and how it is used to guarantee sterilization
Explain why dating of sterilized equipment is necessary
Explain why proper documentation of disinfection and sterilization procedures is necessary

**Competency: Dispose of waste materials in compliance with government regulations**

**Competency Builders:**

Practice safe, sanitary, and sterile procedures
Dispose of noninfectious waste
Dispose of infectious waste
Dispose of hazardous waste
Dispose of controlled substances
Dispose of needles and sharp instruments properly

**Competency: Demonstrate isolation techniques**

**Competency Builders:**

Describe different types of isolation
Demonstrate mask, gown, and gloving techniques
Demonstrate use of protective eyewear/faceshield
Demonstrate double bagging technique
Demonstrate procedures for disposal of soiled materials
Provide care for patient using isolation technique
Collect specimen from isolation patient
Disinfect isolation unit

**Competency: Maintain patient safety**

**Competency Builders:**

Apply restraints (e.g., soft, vest)
Monitor use of restraints
Utilize gait belt
Assist patient to walk with assistive ambulation devices
Demonstrate safe usage of patient transport equipment
Demonstrate safe handling of patient medical equipment (e.g., IV's, catheters, oxygen tubing)
Identify proper bed height
Position patient maintaining proper body alignment, supporting body parts
Demonstrate patient transfer techniques
Identify safety needs of medicated patient
Demonstrate usage of side rails
Identify placement of patient call device
Orient patient to surroundings

**Competency: Explain sexually transmitted diseases (STDs)**

**Competency Builders:**

Differentiate fact from fallacy regarding the transmission and treatment of STDs
Identify community resources and services available to victims of STDs
Identify at-risk behaviors which promote the spread of AIDS
Describe infection control techniques designed to prevent the spread of STDs

**Competency: Practice quality control**

**Competency Builders:**

Identify quality control parameters
Maintain quality control parameters
Prepare quality control charts and graphs
Calculate means, standard deviations, and coefficients of variation
Identify trends, shifts, and "out of control" situations
Address "out of control" situations
Identify bias in control systems
Maintain quality control procedure manual (including laboratory policies; laboratory organization and personnel definition; procedure for collection, labeling, andtransportation of specimens; work sheets; log books, and reporting of results; instructions for processing specimens; laboratory saftey related to biological, chemical, mechanical, and electrical hazards and the disposal of contaminated materials; monitoring quality control of equipoment, media, reagents, and stains)

**Competency: Conduct proficiency testing**

**Competency Builders:**

Explain rules and regulations regarding proficiency testing (i.e, acceptable parameters for constituents, laboratory areas address by proficiency testing, and rules of inspecting agencies and Medicare-approved systems)
Explain the construction of blind and double-blind studies
Compare peer results
List sources of proficiency testing materials
Process proficiency testing materials

# Unit: Medical Terminology

**Competency: Use common medical symbols, abbreviations, and acronyms**

**Competency Builders:**

Identify commonly used symbols (e.g., $O_2$)
Write out full names of commonly used acronyms (e.g., IV, PACU, IPPB, CPAP)
Write out full names of commonly used abbreviations (e.g., bx= biopsy)
Spell medical terms correctly
Demonstrate use of Roman numeral system

**Competency: Demonstrate knowledge of medical terminology**

**Competency Builders:**

Define, spell, and pronounce basic Greek and Latin prefixes and suffixes
Spell basic Greek and Latin prefixes and suffixes
Pronounce basic Greek and Latin prefixes and suffixes
Identify principal terms relating to the body as a whole (e.g., ambulation, hypothermia)
Define terms related to the integumentary system
Define terms related to the skeletal system
Define terms related to the muscular system
Define terms related to the nervous system
Define terms related to the circulatory/cardiovascular system
Define terms related to the lymphatic system
Define terms related to the respiratory system
Define terms related to the digestive system
Define terms related to the endocrine system
Define terms related to the urinary system
Define terms related to the reproductive system
Define terms related to the senses
Define terms related to immunology
Define terms related to pathology

# Unit: Anatomy, Physiology, and Pathology

**Competency: Demonstrate general knowledge of basic chemistry**

**Competency Builders:**

Identify elements on periodic table
Design simple chemical formulas
Contrast atoms verses molecules
Define synthesis, decomposition, and exchange reactions
Define diffusion, filtration, and osmosis
Differentiate between acids and bases

**Competency: Demonstrate general knowledge of the human body**

**Competency Builders:**

Define anatomy and physiology and explain their relationship
Describe the anatomical position
Identify body directions, planes, and cavities
Name the major organ systems and their functions
Classify major organs by the organ system they are within
Define cell composition, shape and size
Identify cell regions and organelles and explain their function
Identify basic life processes of cell division and transportation
Identify the four major tissue types, their function and subtypes
Define neoplasm and distinguish between benign and malignant
Describe effect of aging across the lifespan

**Competency: Demonstrate knowledge of the integumentary system**

**Competency Builders:**

List the functions of the integumentary system
Describe skin's response to touch/pressure, temperature, and pain
Name the layers of the skin
Identify structures associated with the skin, hair, hair follicle, sebaceous gland, and sudoriferous gland
Name the major body membranes
Identify common skin disorders
Describe common types of skin lesions

**Competency: Demonstrate knowledge of the skeletal system**

**Competency Builders:**

List functions of the skeletal system
Name methods of classifying bone
Identify bone types within each classification method
Explain the structure and function of a long bone
Describe the composition of bone
Define function and dysfunction of bone marrow
Explain the process of bone formation and growth
Identify major bones of the human skeleton
Name types of bone markings and their associated terms
Define joint and describe the typical structure of a joint
Name categories of joints
Compare the amount of movement allowed by each type of joint
Define types of motion
Identify various types of fractures
Identify the various methods of correction for fractures
Identify common disorders and injuries of bones and joints

**Competency: Demonstrate knowledge of the muscular system**

**Competency Builders:**

Identify types of muscle tissue
Describe muscle contraction
Define the parts of a muscle and explain major muscle types
Define muscle tone, isotonic and isometric contractions
Name types of movements produced by skeletal muscle contractions
Identify the major muscles of the human body
Identify common abnormal conditions of the muscles
Identify origin, insertion and function of muscles
Describe common disorders and injuries of the muscles

**Competency: Demonstrate knowledge of the nervous system**

**Competency Builders:**

Describe the general functions of the nervous system
Identify the main parts of the nervous system
Name principle cell types that compose the nervous system
Describe the neuron, its function, and the existing types of neurons
Describe the neuralgia, its function, and the existing types of neuralgia
Define ganglia, nuclei, tracts and nerves, noting their differences
Describe the events of the nerve impulse
Identify parts of the brain
Describe structures and functions of the various parts of the brain and spinal cord
Explain function of the autonomic nervous system and its divisions
Describe common disorders and injuries of the nervous system

**Competency: Demonstrate knowledge of the circulatory/ cardiovascular system**

**Competency Builders:**

Identify the structures and functions of the heart
Trace the pathway of blood through the heart
Describe routes of blood circulation
Define blood pressure, pulse, systole, diastole and cardiac cycle
Describe the pathway of impulses through the heart's conduction system
List factors that influence heart rate
Identify the structure and function of the blood vessels - arteries, veins and capillaries
Identify major blood vessels
Identify structures involved in fetal circulation
Identify several pulse points
Identify major components of blood
Identify the blood types
Describe the blood clotting process
Describe common disorders of the circulatory/cardiovascular system

**Competency: Demonstrate knowledge of the lymphatic system**

**Competency Builders:**

Name the structures composing the lymphatic system
Identify the functions of the lymphatic system
Explain the relationship between the lymphatic system and the cardiovascular system
Explain the immune response in relationship to the lymphocytes
Define antigens
Define antibodies and ways in which antibodies act against antigens
Differentiate between active and passive immunity
Describe common disorders of the lymphatic system

**Competency: Demonstrate knowledge of the respiratory system**

**Competency Builders:**

Identify major respiratory system organs and structures describing the function of each
Describe the function of major respiratory system organs and structures
Define cellular respiration, external respiration, internal respiration, ventilation, expiration and inspiration
Describe the process of gas exchange in the lungs and the tissues
Explain role of the respiratory muscles in breathing
Identify brain areas involved in the control of respiration
Explain respiratory volumes and capacities
Describe a common disorders and injuries of the respiratory system

**Competency: Demonstrate knowledge of the digestive system**

**Competency Builders:**

Identify the structures and functions of the digestive system
Describe the mechanisms of mastication, swallowing, vomiting and defecation
Define anabolism and catabolism
Define basal metabolic rate and total metabolic rate
Describe common disorders of the digestive system

**Competency: Demonstrate knowledge of the endocrine system**

**Competency Builders:**

Differentiate between endocrine and exocrine glands
Identify major endocrine glands and hormones produced by each
Explain response of body systems to hormones
Describe common endocrine gland disorders

**Competency: Demonstrate knowledge of the urinary system**

**Competency Builders:**

Identify components of the urinary system
Explain the functioning of the urinary system
Identify nitrogenous waste found in the urine
Explain how water and electrolyte balance is maintained by the body
Define micturition
Explain how micturition occurs
Describe common disorders of the urinary system

**Competency: Demonstrate knowledge of the reproductive system**

**Competency Builders:**

Explain the general function of the reproductive system
Identify major organs of the reproductive system
Describe the phases of the menstrual cycle
Explain the process of meiosis, spermatogenesis, and oogenesis
Identify stages of embryonic development
Explain the physiology of childbirth
Describe common disorders of the reproductive system

**Competency: Demonstrate knowledge of the senses**

**Competency Builders:**

Identify major structures and functions of vision, hearing, balance, smell, taste, and touch
Define refraction, accommodation, real image, and emmetropic
Describe common disorders and injuries of the senses

**Competency: Demonstrate knowledge of immunology**

**Competency Builders:**

Explain the immune response in relationship to the lymphocytes
Define antigens and antibodies
Explain the differences among the five major classes of antibodies
Describe the relationship between antigens and antibodies
Differentiate between active and passive immunity
Describe common immunodeficiencies, allergies, and autoimmune disorders

# Unit: Medical Law and Ethics

**Competency: Comply with medical law and ethics**

**Competency Builders:**

Differentiate between legal and ethical behavior
Explain terms, principles, and characteristics of legal and ethical behavior
Explain state and federal rules and regulations governing the practice of the profession
Explain legal ramifications of breaching rules and regulations
Explain effects of unethical and/or unlawful behavior of health care professionals
Practice within the role and scope of the profession as defined by law, job description, and facility/arena of practice

**Competency: Exhibit ethical behavior**

**Competency Builders:**

Describe ethical dilemma in health care (e.g., death and dying, medical ethics committees)
Explain health care professional's responsibility in situations of patient abuse and neglect
Explain health care professional's responsibility in situations of coworker chemical addition
Identify personal, societal, and global implications of substance use and abuse
Explain effects of unethical behavior of health care professionals

**Competency: Describe legal ramifications of misconduct**

**Competency Builders:**

Explain terms, principles, and characteristics of legal and ethical behavior
Explain legal and ethical ramifications of breaching patient confidentiality

**Competency: Practice discretion regarding patient information**

**Competency Builders:**

Identify components of Patient Bill of Rights
Communicate patient's rights
Identify patient's rights and responsibilities
Describe reasons for sharing patient information
Identify appropriate persons to whom information can be released
Describe methods of maintaining confidentiality
Explain truth-in-ending law
Explain anatomical gift act
Explain advance directives
Explain living will
Explain informed consent
Identify reasons for termination of patient services
Explain consequences of noncompliance with physician's recommendations
Explain remuneration
Describe impact of communicable diseases
Describe the importance of proper sample identification

**Competency: Practice personal professional protocol with medical community**

**Competency Builders:**

Explain process of certification/licensure of health professionals
Comply with tax requirements
Maintain integrity of personal files
Explain the statute of limitation
Identify ownership of medical records
Maintain procedures for legal access to patient and/or records
Investigate professional liability coverage options

# Unit: Psychology of Stress

**Competency: Analyze factors that influence a patient's response to stress**

**Competency Builders:**

Explain stress as a concept
Differentiate between stress and stressors
Explain how an individual's perception of stress influences his response to stressors
Explain how internal and external mitigating factors influence one's response to stress
Identify coping mechanisms used to decrease stress
Identify biological adaptive responses to stress

**Competency: Analyze physiological response to stress**

**Competency Builders:**

Describe the stress response on the autonomic nervous system, endocrine system, cardiovascular system, renal system, respiratory system, and hemopoietic system
Explain how the internal and external non-specific mitigating factors relate to the physiological stress response
Differentiate between immune systems response to stressors in children and adults
Explain how the concept of stress relates to activation of the disease process

**Competency: Analyze psychological response to stress**

**Competency Builders:**

Identify psychological stressors
Describe the relationship between personality types and the stress response
Summarize the primary and secondary appraisal of a stressor
Differentiate between cognitive and behavioral coping mechanisms
Differentiate among problem-focused, emotion-focused, and appraisal-focused coping in relation to stressors
Identify a patient's ability to cope with stress based on individual and stressor characteristics
Identify types of coping strategies
Identify selected defense mechanisms
Summarize ineffective coping behaviors
Explain the psychobiologic response of anxiety as it relates to stress
Describe the disequilibrium associated with response to stressors

**Competency: Provide care for a patient with an ineffective coping response**

**Competency Builders:**

Assess psychological responses to stress in a patient
Promote exploration of feelings when providing nursing care
Describe strategies to assist in stress reduction
Implement strategies to assist in stress reduction
Evaluate selected nursing interventions and suggest alternative measures

# Unit: Psychology of Human Relations

**Competency: Explain human growth and development**

**Competency Builders:**

Describe characteristics of growth and development from conception to birth
Describe characteristics of growth and development from birth through preschool
Describe characteristics of growth and development from school age through adolescence
Describe characteristics of growth and development of the adult through the life span

**Competency: Demonstrate appropriate communication techniques**

**Competency Builders:**

Identify components of provider-client relationship
Identify ways to cope with stress
Identify uniqueness of individual (e.g., cultural, generational, social, ethnic)
Treat clients with respect and dignity
Identify assertive and aggressive responses
Differentiate between acceptable and unacceptable touching
Identify barriers to communication

**Competency: Establish rapport**

**Competency Builders:**

Describe proper manner for greeting a patient
Adapt communication to individual's ability to understand (e.g., functioning level, emotional state, and educational level)
Respond to verbal and nonverbal communication
Serve as liaison between physician, patient, and others
Solicit patient's understanding of communication
Translate medical terms into language patient can understand
Interpret patient's reaction to illness and disability
Describe individual, cultural and socioeconomic differences in people
Identify methods in which to communicate with patients or responsible party with sensory disorders
Support patient/responsible party during the grief process
Orient patient to policies, facilities, and staff
Respond to patient/responsible party in a therapeutic manner
Identify patient personality types
Treat patient with empathy and impartiality
Support patient's right to make decisions regarding care
Encourage ventilation of patient/responsible party's feelings

**Competency: Follow established procedures for communication and documentation**

**Competency Builders:**

Transmit reports of patient status
Demonstrate basic computer skills
Complete interdepartmental requisitions (e.g., therapies, procedures, tests)
Complete an incident report
Monitor accuracy in all communications
Initiate medical records according to institutional policies
Maintain medical records according to institutional policies
Identify need for documenting and reporting
Interpret patient-related documents participate in team conferences
Report change in patient status
Clarify physicians orders
Differentiate charting methods
Respond to request for service
Respond to request from patient's funding source
Notify patient or responsible party of changes required in treatment plan
Write instructions for use of patient equipment (e.g., orthosis, prosthesis)
Write instructions for a home therapy program
Witness a consent form
Create an informational display

**Competency: Document patient progress**

**Competency Builders:**

Record current treatment rendered and patient response
Include parameters in notes (e.g., subjective, objective, assessment, plan)
Use correct grammar, spelling, and approved abbreviations
Secure appropriate signatures
Write legibly
Use appropriate resources

# Unit: First Aid and Medical Emergencies

**Competency: Use emergency procedures**

**Competency Builders:**

Identify emergency procedures
Contact local emergency assistance
Demonstrate first responder procedures
Acquire first aid certification
Acquire CPR certification

**Competency: Perform first aid**

**Competency Builders:**

Assist with first aid for wounds or fractures
Administer first aid to control bleeding
Administer first aid for shock
Administer first aid for burn patient
Assist with first aid for poisoned patient
Assist with choking patient
Assist with patient having seizure
Assist with syncopal patient

**Competency: Maintain cardiopulmonary resuscitation (CPR) according to accrediting agency standards**

**Competency Builders:**

Update CPR certification
Administer CPR to infants and children
Administer CPR to adults
Administer care for obstructed airways for infants, children, and adults

**Competency: Respond to medical emergencies**

**Competency Builders:**

Identify patient
Perform head to toe patient assessment
Assess patient needs
Describe signs and symptoms of emergency situations
Identify basic emergency equipment
Take appropriate action

# Unit: General Administrative Duties

**Competency: Perform scheduling and recordkeeping duties**

**Competency Builders:**

Schedule patient appointments
Coordinate activities with other departments
Coordinate activities with community agencies
Schedule space and equipment for therapy
Maintain daily charges for equipment/treatment
Comply with reimbursement requirements
Maintain patient files/charts
Maintain patient attendance records
Schedule reoutine equipment maintenance and repair

**Competency: Perform other departmental duties**

**Competency Builders:**

Assist in dealing with vendors
Assist in maintenance of departmental budget
Assist in writing/revising job description
Assist in writing/revising forms (e.g., home programs, documentation forms)
Maintain departmental cleanliness
Maintain inventory/supplies

**Competency: Manage reception area**

**Competency Builders:**

Prepare reception area
Greet visitors and patients
Advise patient of office hours
Manage children accompanying patient
Identify ways to communicate with patients with sensory disorders
Screen non-patient visitors
Explain delays to patients physician's fees

**Competency: Demonstrate telephone handling techniques**

**Competency Builders:**

Place calls
Record telephone messages (e.g., date, time, initial calls)
Screen calls
Transfer calls
Obtain information for return calls
Handle emergency calls
Make arrangements for patient's admission to hospital
Make patient referrals
Phone prescriptions to pharmacy

**Competency: Maintain appointment schedules**

**Competency Builders:**

Write appointments legibly
Prepare appointment calendar
Record appointments
Prepare appointment cards
Maintain recall system
Confirm appointments
Schedule outpatient diagnostic tests
Make referral appointments for patients

**Competency: Maintain medical records and laboratory reports**

**Competency Builders:**

Obtain patient information
Prepare folder
Prepare charge documentation
Explain importance of records management
File information alphabetically or numerically according to office protocol
Retrieve patient record from file
Prepare cross-reference file
Process incoming medical reports
Purge records
Prepare reports concerning patient care, condition, census, accidents, and incidents
Maintain current documentation of patient status and care
Complete immunization records
Compile patient laboratory reports
Process completed laboratory reports
Document results from reference laboratories
Verify tests ordered and test received

**Competency: Prepare office communications**

**Competency Builders:**

Compose business correspondence
Edit business correspondence
Transcribe letters from dictating machine
Keyboard business correspondence
Print documents
Proofread for errors in correspondence
Complete appropriate consent forms
Address envelopes
Process incoming mail
Maintain files for correspondence
Classify outgoing mail
Label outgoing mail

**Competency: Use office equipment**

**Competency Builders:**

Operate calculator
Operate checkwriter
Operate computer
Operate copy machine
Operate fax machine
Operate multi-line telephone system

**Competency: Demonstrate knowledge of different payment systems**

**Competency Builders:**

Identify required procedures for private carriers
Identify required procedures for non-insured patients
Identify required procedures for health maintenance organization (HMO)
Identify required procedures for preferred provider organization (PPO)
Identify required procedures for independent practitioner association (IPA)
Identify required procedures for U.S. government employees (CHAMPUS)
Identify required procedures for Aid to Dependent Children (ADC)
Identify required procedures for general assistance (GA)
Identify required procedures for Medicare
Identify required procedures for Medicaid
Identify required procedures for worker's compensation

**Competency: Perform diagnostic coding**

**Competency Builders:**

Stay current with diagnostic coding changes
Complete forms for international classification of diseases (ICD-9 CM)
Complete forms for current procedural terminology (CPT)
Complete forms for health care procedural code (HCPC)
Complete forms for diagnostic related groups (DRG)
Complete forms for J-codes

**Competency: Process insurance claims/forms**

**Competency Builders:**

Define primary and secondary carriers
Define third party administrators
Explain payment and rejection procedures (e.g., co-pays, deductibles, errors)
Process quick-claim forms
Use procedure codes
Log and track insurance claims/forms

**Competency: Perform financial functions**

**Competency Builders:**

Apply basic bookkeeping fundamentals
Interpret and explain fees
Arrange financial agreements
Complete ledger
Prepare account summaries
Collect fees
Issue receipts
Maintain petty cash account
Prepare bank deposits
Verify invoices
Collect delinquent bills
Collect and post payments
Process credit card transactions
Prepare checks for signature
Prepare payroll
Reconcile bank statements, cash, and/or receipts
Complete Worker's Compensation forms and Medicare/Medicaid forms
Prepare schedule of accounts receivable
Prepare schedule of accounts payable
Maintain accounts receivable
Maintain accounts payable

# Unit: Vital Signs

**Competency: Interview patient**

**Competency Builders:**

Complete patient information sheets
Record medical history (e.g., allergies, current medications)
Assess bio-psycho-social condition
Validate data with patient or patient's family member(s)

**Competency: Measure temperature**

**Competency Builders:**

Follow safety and aseptic precautions for taking temperature
Identify normal range and average temperature of oral, axillary, tympanic, and rectal methods of measuring body temperature
Identify factors that may affect temperature
Select route for measuring temperature
Demonstrate use of different types of thermometers
Record temperature measurements
Report abnormal temperature measurements
Maintain thermometer(s)

**Competency: Measure pulse**

**Competency Builders:**

Identify criteria for selecting pulse site (e.g., femoral, apical, radial)
Identify normal pulse range for different age groups
Identify factors that may affect pulse
Identify variations from normal pulse that should be reported
Record pulse

**Competency: Measure respiration**

**Competency Builders:**

Assess lung sounds
Measure rate, depth, and rhythm of respiration
Identify normal respiratory rate for different age groups
Report signs of compromised respiration
Identify factors that may affect respiration
Record respiration

**Competency: Measure blood pressure**

**Competency Builders:**

Identify myths and misconceptions related to blood pressure and hypertension
Identify etiology of hypertension
Identify consequences of untreated hypertension
Identify normal range of blood pressure for different age groups
Record blood pressure
Identify factors that affect blood pressure
Select appropriate cuff size
Describe the effect of inappropriate cuff size on accurate blood pressure reading
Identify variations from normal blood pressure that should be reported
Demonstrate use of aneroid sphygmomanometer gmomanometer
Demonstrate use of mercurial sphygmomanometer gmomanometer
Demonstrate palpated blood pressure

**Competency: Obtain physical measurements**

**Competency Builders:**

Measure adult height
Measure adult weight
Measure adult chest and waist expansion
Measure infant height
Measure infant weight
Measure infant head and chest circumference
Measure auditory status (e.g., tympanogram)
Measure visual status (e.g., eye chart)
Identify color blindness
Record all results

# Unit: Nutrition

**Competency: Identify fundamentals of nutrition**

**Competency Builders:**

Identify nutrients and food groups
Explain role of nutrients to body functions
Explain regional, cultural, and religious food patterns
List factors which must be considered when purchasing food
Identify component of a balanced diet across the life span (e.g., USDA Food pyramid)
List factors which must be considered when storing food
Identify methods of food preparation
Instruct patient in sound nutrition principles

**Competency: Identify nutritional needs related to special conditions and/or diseases**

**Competency Builders:**

Describe common diets related to health alterations (e.g., pureed, mechanical-soft)
Describe special diets
Identify community resources
Identify risks of non-compliance with dietary restrictions
Educate patient regarding dietary hazards (e.g., caffeine, fats)

**Competency: Draw correlation between diet and exercise**

**Competency Builders:**

Identify methods of exercise
Explain effect of exercise and food on energy level
Write an exercise plan
Identify weight-related issues

**Competency: Identify facets of alternative nutrition**

**Competency Builders:**

Identify indications and effects of tube feedings
Identify indications and effects of intravenous fluids
Identify indications and effects of lipids
Identify indications and effects of hyperal

# Unit: Basic Pharmacology

**Competency: Maintain supply of medications**

**Competency Builders:**

Check inventory stock
Contact supplier
Rotate stock
Process narcotic forms (i.e., Drug Enforcement Agency (DEA) license)
Store medications properly
Prepare expired medications for disposal
Dispose of medications properly (i.e., comply with government regulations)

**Competency: Calculate dosage according to physician's orders**

**Competency Builders:**

Verify accuracy of medical orders
Use Physician's Desk Reference (PDR)
Transcribe medication order
Calculate oral dosage
Calculate parenteral dosage
Calculate sublingual dosage
Calculate pediatric dosage
Calculate intravenous dosage and rate of flow

**Competency: Instruct patients on use of medications**

**Competency Builders:**

Provide verbal and/or written instructions for medication use
Explain use of medications (e.g., identify side effects, adverse effects, interactions)
Maintain standing orders according to physician's protocol (e.g., prescription refills)

**Competency: Dispense medications according to medical orders**

**Competency Builders:**

Identify patient
Verify patient allergies
Use reference materials
Verify accuracy of medical orders
Calculate dosages
Prepare oral medication
Identify correct anatomical sites
Prepare intramuscular, intradermal, and subcutaneous injectable medications
Prepare and administer sublingual medications
Prepare transdermal medications
Prepare inhalant medications
Prepare instillation medications
Prepare and administer topical medications
Prepare and administer rectal medications
Prepare and administer vaginal medications
Assist with administration of local anesthesia
Administer medications
Document medication administration
Document patient response to medications

**Competency: Evaluate response to medication**

**Competency Builders:**

Identify possible adverse reactions to medication
Assess patient reaction to medication
Report untoward reactions to appropriate sources
Document patient response to medication

# Unit: Patient Education

**Competency: Inform patient/family about diagnostic procedures**

**Competency Builders:**

Distribute literature regarding advised procedure
Explain diagnostic procedures
Explain preparation for diagnostic procedures
Translate medical terminology into lay terms
Distribute resource materials related to test results
Schedule patient follow-up
Obtain informed consent signature

**Competency: Educate patient/responsible party about self-care related to results of diagnostic procedure/therapy**

**Competency Builders:**

Identify support groups and resources
Obtain verbal and written information to plan patient's care
Reinforce special diets with patient/responsible party
Reinforce recommended exercise programs with patient/responsible party
Reinforce specialized applications (e.g., ortho, dietary, ostomy, splints, orthotics) with patient/responsible party
Reinforce self-administration of medications with patient/responsible party
Reinforce health maintenance techniques with patient/responsible party
Refer patient/responsible party to support groups and resources
Solicit patient/responsible party feedback
Record teaching and patient response
Instruct patient/responsible party in necessary adaptations to environment
Instruct patient/responsible party in adaptive techniques (e.g., activities of daily living, homemaking)

**Competency: Provide psycho-social care for patient/family**

**Competency Builders:**

Arrange emotional support for patient and family member(s)
Report child abuse and/or neglect
Respond to emotional needs of terminally ill patient and family member(s)
Apply reality orientation technique
Arrange diversional activity for patient

**Competency: Inform patient about World Health Organization (WHO) immunization requirements**

**Competency Builders:**

Instruct patient/family on infant, preschool, adolescent, and adult immunizations
Instruct patient/family on international requirements
Reinforce instructions from other health professionals to patient/family member(s)

# Unit: Laboratory Tests and Diagnostic Procedures

**Competency: Perform drug screen testing**

**Competency Builders:**

Demonstrate safe use of equipment
Record results accurately
Collect and label specimen accurately

**Competency: Perform tuberculosis testing**

**Competency Builders:**

Administer tine test
Administer Mantoux test
Interpret test results

**Competency: Perform specimen collection and handling**

**Competency Builders:**

Collect eye, nose, and throat specimens for culture
Collect urine (e.g., clean-catch, sterile, 24-hour, midstream, catheter)
Collect stool specimen
Demonstrate proper techniques to perform venipuncture and capillary puncture
Collect wound specimens
Collect sputum specimens
Collect capillary blood
Collect venous blood using syringe
Collect venous blood using vacutainer
Label all collected specimens properly
Package specimen for mailing/shipping
Transport specimen
Differentiate among timed specimens, fasting specimens, and state specimens
Describe general criteria for suitability of a specimen for analysis
Describe conditions that must be met if specimens and tests are to be used as legal evidence

**Competency: Assist with allergy testing**

**Competency Builders:**

Prepare tray
Perform scratch test (e.g., ID test)
Perform patch test
Perform intradermal test

**Competency: Perform manual and automated tests of complete blood count**

**Competency Builders:**

Perform hematocrit (Hct)
Perform hemoglobin determination (hgB)
Perform red blood cell counts (RBC)
Perform white blood cell counts (WBC)
Perform white blood cell differential (diff)
Perform erythrocyte sedimentation rate (ESR)
Perform prothrombin time (PT)

**Competency: Perform serological tests**

**Competency Builders:**

Prepare serum
Perform serum blood chemistries
Separate plasma or serum from cells
Perform ABO and Rh typing
Perform monospot test
Perform serum pregnancy test (HCG)
Package record data and set-up delivery of blood samples

**Competency: Perform electrocardiograms**

**Competency Builders:**

Mount a 12-lead electrocardiogram
Run and record a standard
Set-up Holtor monitors
Clean electrocardiogram equipment

**Competency: Perform diagnostic skills**

**Competency Builders:**

Perform neurological checks
Perform urinary tests (e.g., sugar and acetone, protein, ketones, specific gravity)
Assist with laboratory tests (e.g., blood gases, lumbar puncture)
Measure blood glucose level
Maintain monitoring equipment (e.g., cardiac monitor, pulse oximeter)
Measure central venous pressure (CVP)
Perform electrocardiogram (ECG)
Perform visual screening
Perform auditory screening

**Competency: Demonstrate laboratory procedures in clinical chemistry**

**Competency Builders:**

List requirements for patient preparation
Describe special collection techniques (e.g., 24 hr. urine G)
Handle specimen properly
Correlate test procedure to methodology
Identify normal versus panic values
Identify clinical significant

**Competency: Demonstrate laboratory procedures in hematology/coagulation**

**Competency Builders:**

List requirements for patient preparation
Handle specimen properly
Correlate test procedure to methodology
Identify normal versus panic values
Identify clinical significance of test value

**Competency: Demonstrate laboratory procedures in immunohematology**

**Competency Builders:**

List requirements for patient preparation
Handle specimen properly
Correlate test procedure to methodology
Identify normal versus panic values
Identify clinical significance of test value

**Competency: Demonstrate laboratory procedures in microbiology**

**Competency Builders:**

List requirements for patient preparation
Handle specimen properly
Correlate test procedure to methodology
Identify normal verses panic values
Identify clinical significance of test value

**Competency: Demonstrate laboratory procedures in immunology**

**Competency Builders:**

List requirements for patient preparation
Handle specimen properly
Correlate test procedure to methodology
Identify normal verses panic values
Identify clinical significance of test value

**Competency: Demonstrate laboratory procedures in urinalysis**

**Competency Builders:**

List requirements for patient preparation
Handle specimen properly
Correlate test procedure to methodology
Identify normal verses panic values
Identify clinical significance of test value

**Competency: Demonstrate safe phlebotomy techniques**

**Competency Builders:**

Assemble equipment (e.g., vacutainers, bottles)
Differentiate venous versus arterial collection procedures (e.g., Allen test)
Prepare patient for procedure (e.g., establish rapport)
Care for phlebotomy site
Collect capillary blood
Collect venous blood with syringe
Collect venous blood with vacutainer
Collect blood culture
Handle specimen(s) properly

**Competency: Administer laboratory management skills**

**Competency Builders:**

Describe different management styles
Explain personnel evaluation process
Apply accounting principles
Analyze statistical data
Schedule personnel equitably
Negotiate contracts
Identify regulatory agencies (e.g., OSHA, CAP, JCAHO, AABB)
Explain Clinical Laboratory Improvement Amendment

# Unit: Clinical Chemistry

**Competency: Use terminology related to clinical chemistry**

**Competency Builders:**

Define clinical chemistry terms
Spell clinical chemistry terms
Identify the designations used for weights and measures
Use the abbreviations for weights and measures

**Competency: Prepare solutions**

**Competency Builders:**

Prepare molar solutions
Prepare normal solutions
Prepare percentage solutions (e.g., w/w, w/v, v/v)

**Competency: Handle blood specimens for analysis**

**Competency Builders:**

List differences between serum, plasma, and whole blood
Use anticoagulants for each analysis performed
Explain effects of using improper anticoagulants
Explain ways to prevent hemolysis
Collect blood in collecting tubes for analysis (e.g., clotted, anticoagulant)

**Competency: Handle body fluids for chemical analysis**

**Competency Builders:**

List types of urine preservatives
Explain when different types of urine preservatives are used
Perform cerebral spinal fluid analyses
Perform analyses of other body fluids
Apply Beer's Law

**Competency: Perform kidney function and clearance tests**

**Competency Builders:**

Explain kidney function tests
Perform kidney function tests (e.g., creatinine)
List the normal values of kidney function tests
Explain kidney clearance tests
Perform kidney clearance tests (e.g., creatinine clearance)
List the normal values of kidney clearance tests
Calculate kidney function tests
Identify kidney related pathologies (e.g., renal failure)

**Competency: Perform liver function tests**

**Competency Builders:**

Identify liver function tests
Perform liver function tests
Identify tests that are elevated in liver disease
Identify liver enzymes and isoenzymes
List normal values of liver function tests
Identify abnormal values
Identify liver related pathologies (e.g., cirrhosis)
Identify tests that are elevated in obstructive jaundice
Identify tests that are elevated in hemolytic jaundice

**Competency: Perform glucose tests**

**Competency Builders:**

Define terminology related to carbohydrates
List the uses of carbohydrates by the body
Describe the tests for all carbohydrates and reducing substances
Describe the true glucose tests (glucose specific)
Perform blood tests for glucose
Perform urine tests for glucose
Perform spinal fluid tests for glucose
Perform oral glucose tolerance test
Perform intravenous glucose tolerance test
Differentiate among a normal glucose tolerance curve, a diabetic glucose tolerance curve, and a hypoglycemia curve
Identify normal values

**Competency: Perform protein tests**

**Competency Builders:**

List functions of proteins
List what makes up a total protein
Explain the A/G ratio
List body constituents made up of protein (e.g., hemoglobin, fibrinogen, enzymes)
Explain the methods of total protein analysis
List normal values of total protein analysis
Explain the principles of total protein analysis tests
Explain the various methods of albumin analysis
List the normal values of albumin analysis
Explain the principles of albumin analysis tests
Explain the various methods of globulin analysis
List the normal values of globulin analysis
Explain the principles of globulin analysis tests
Explain the principle of protein electrophoresis
Explain the various procedures for protein electrophoresis
Describe the proper migration pattern of the plasma proteins
Identify electrophoretic patterns in disease
Perform various methods for protein tests

**Competency: Perform electrolytes tests**

**Competency Builders:**

Define cations and anions
Explain electrolyte balance
Define extracellular cations and anions
Define intracellular cations and anions
List the normal values of cations and anions
Perform tests for anions and cations
List abnormal values
Calculate anion gap
Explain methods of electrolyte testing

**Competency: Perform carbon dioxide tests**

**Competency Builders:**

Explain different carbon dioxide tests
Perform different carbon dioxide tests
Identify normal values of carbon dioxide tests
Identify abnormal values

**Competency: Perform blood gas tests**

**Competency Builders:**

List normal blood gas values
Explain the various methods of blood gas analysis
Perform blood gas analysis
Identify abnormal values
Identify respiration acidosis/alkalosis
Identify metabolic acidosis/alkalosis

**Competency: Explain mineral metabolism**

**Competency Builders:**

List the minerals of the body
Describe mineral metabolism
List normal values
List abnormal values
Perform mineral analysis

**Competency: Perform enzyme analysis**

**Competency Builders:**

Describe methods of enzyme analysis
List the enzymes of the pancreas and their functions
Describe the tests used to determine pancreatic enzyme activities
List the enzymes and isoenzymes of the heart and their functions
List the order in which enzymes and/or isoenzymes of the heart rise and return to normal
Explain LDH1:2 flip
Explain the use of acid phosphatase
Perform various enzyme analysis tests
List the enzymes and isoenzymes of the liver and their functions
Explain the use of acid phosphatase
List the parts of the body that are rich in acid phosphatase
List normal ranges

**Competency: Perform thyroid gland tests**

**Competency Builders:**

Explain the function of the thyroid gland
Explain various thyroid function tests
Perform thyroid function tests
List normal values of thyroid function tests
Identify thyroid related pathologies (e.g., hyperthyroid disease)

**Competency: Perform tests for gout**

**Competency Builders:**

Explain the principle of the test for gout (uric acid)
Perform the test for uric acid
List the metabolism of purines in food
Explain how uric acid is formed

**Competency: Perform miscellaneous tests**

**Competency Builders:**

Perform gastric analysis
Perform phenolsulfonphthalein test
Explain principles of electrophoresis
Perform therapeutic drug monitoring
Perform tests for drug abuse
Identify therapeutic values
Perform tests for HDL, LDL, VLDL, cholesterol, triglyceride, and other lipids

**Competency: Use laboratory instruments**

**Competency Builders:**

List the parts of the photoelectric colorimeter and their functions
Explain the principle of the photoelectric colorimeter
Use a photoelectric colorimeter
List the parts of the spectrophotometer and their functions
Explain the principle of the spectrophotometer
Explain the difference between a colorimeter and a spectrophotometer
Describe how light waves are measured
Use a spectrophotometer
Define terminology related to light and wavelengths
Calibrate a colorimeter and spectrophotometer
List the parts of a flame photometer and their functions
Explain the principle of the flame photometer
List the chemicals that are analyzed by the flame photometer
Use a flame photometer

**Competency: Use laboratory instruments (continued)**

**Competency Builders:**

List the parts of an atomic absorption spectrophotometer and their functions
Explain the principle of the atomic absorption spectrophotometer
List the uses of the atomic absorption spectrophotometer
Use an atomic absorption spectrophotometer
List the parts of the fluorescence spectrophotometer and their functions
Explain the principle of the fluorescence spectrophotometer
List the tests performed on the fluorescence spectrophotometer
Use a fluorescence spectrophotometer
List the parts of continuous flow analysis and their functions
Perform continuous flow analysis
List the instruments that perform discrete analysis, the parts related to them, and their functions
Use discrete analysis instruments
List the parts of a random access analyzer and their functions
Explain the principle of the random analyzer
List the chemicals that are analyzed by a random analyzer
Use a random analyzer
List the parts of a radioimmunoassay (RIA) analyzer and their functions
Explain the principle of an RIA analyzer
List the chemicals that are analyzed by an RIA analyzer
Use an RIA analyzer
List the parts of an enzyme immunoassay (EIA) analyzer and their functions
Explain the principle of an EIA analyzer
List the chemicals that are analyzed by an EIA analyzer
Use an EIA analyzer
List the parts of a nephelometer analyzer and their functions
Explain the principle of a nephelometer analyzer
List the chemicals that are analyzed by nephelometer analyzer
Use a nephelometer analyzer
List the parts of an osmometer analyzer and their functions
Explain the principle of an osmometer analyzer
List the chemicals that are analyzed by an osmometer analyzer
Use an osmometer analyzer
List the parts of an ultraviolet spectrophotometer analyzer and their functions
Explain the principle of an ultraviolet spectrophotometer analyzer
List the chemicals that are analyzed by an ultraviolet spectrophotometer analyzer
Use an ultraviolet spectrophotometer analyzer

**Competency: Use laboratory instruments (continued)**

**Competency Builders:**

List the parts of a fluorescence polorization immunoassay (FPIS) analyzer and their functions
Explain the principle of an FPIS analyzer
List the chemicals that are analyzed by an FPIS analyzer
Use an FPIS analyzer
Use other laboratory instruments (e.g., balance, pH meter, refractometer, blood gas apparatus, electrophoresis apparatus, automatic pipette, burette)

**Competency: Maintain laboratory instruments**

**Competency Builders:**

Maintain chemical analyzers
Maintain other laboratory instruments (e.g., balance, pH meter, refractometer, blood gas apparatus, electrophoresis apparatus, automatic pipette, burette)
Clean glassware and pipettes
Maintain glassware and pipettes

# Unit: Immunohematology

**Competency: Use terminology related to immunohematology**

**Competency Builders:**

Define immunohematology-related terminology
Spell immunohematology-related terminology
Define secretors
Explain significance of secretors in immunohematology
Identify blood components

**Competency: Explain antigens and antibodies**

**Competency Builders:**

Explain the principle of antigen-antibody reactions
Describe the history of the ABO system and the Rh system
Chart the chemical structure of the H, A, and B antigens
Describe the antigens of the ABO system
Describe the antibodies of the ABO system
List the phenotypes and genotypes of the Rho(D) system
Explain the genetics of blood group antigen
Describe additional antigen systems (e.g., M&N, Duffy, Lewis, Kell)

**Competency: Describe antibodies**

**Competency Builders:**

List the five major immunoglobulins
List the immunoglobulins or antibodies that are important in the ABO and Rh systems
List the natural antibodies and their functions
List the 7S and 19S antibodies and their functions
Explain the function of bivalent or complete antibodies
Explain the function of univalent, incomplete, or blocking antibodies
Explain Zeta potential
Describe how the anti-human globulin helps in detecting the blocking, univalent, or incomplete antibody
Explain how anti-human globulin is produced

**Competency: Describe subgroups of A**

**Competency Builders:**

List the subgroups of A
Describe how subgroups of A are tested

**Competency: Describe enzyme tests**

**Competency Builders:**

List the enzyme tests that are used in immunohematology
Differentiate purposes and methods of enzyme tests used in immunohematology

**Competency: Describe Rh nomenclatures**

**Competency Builders:**

Explain Fisher-Race nomenclature
Explain Wiener nomenclature
Explain Rosenfeld nomenclature
Compare Fisher-Race, Wiener, and Rosenfeld nomenclatures

**Competency: Perform Du test**

**Competency Builders:**

Perform Du test in Rh typing
Perform Du test to choose donors for transfusions
Perform Du test for blood recipients

**Competency: Describe M and N systems**

**Competency Builders:**

Differentiate M and N systems
Use M and N systems in immunohematology

**Competency: Type blood**

**Competency Builders:**

Perform direct or forward blood group slide and tube method
Perform reverse typing
Perform Rho(D) typing–slide and tube
Perform typing for subgroups of A
Perform genotyping
Explain the principle of the antiglobulin test
Explain the principle of the indirect antiglobulin test
Perform indirect antiglobulin test
Interpret indirect antiglobulin test
List the uses of the indirect antiglobulin test
Perform direct antiglobulin test
Interpret direct antiglobulin test
List uses of direct antiglobulin test
List drugs responsible for red blood cell sensitization that cause a positive direct antiglobulin test
Perform direct antiglobulin profile
Interpret the direct antiglobulin profile

**Competency: Crossmatch blood**

**Competency Builders:**

Explain the principle of the crossmatch procedure
Perform crossmatch procedure (i.e., anti-human globulin crossmatch)
Interpret results of crossmatch procedure
List reasons for autocontrol on crossmatch test
Perform autocontrol test with crossmatch
Explain reasons for using Coombs control test
Perform Coombs control test
List errors that can occur in the crossmatch procedure (e.g., overmixing after centrifugation, improper washing of Coombs tube before addition of Coombs serum)
Identify incompatible crossmatch
Perform follow-up procedures for incompatibility

**Competency: Use Rho(d) immune globin criteria**

**Competency Builders:**

Explain the principle of the Rho(D) immune globin
List to whom Rho(D) immune globin should be given
List indications as to when Rho(D) should be given
List the criteria used to declare patients candidates for receiving Rho(D) immune globin

**Competency: Detect cold agglutinins**

**Competency Builders:**

Define cold agglutinins
Perform tests to detect cold agglutinins
Eliminate cold agglutinins when they interfere with blood grouping and/or crossmatching of blood

**Competency: Elute antibodies**

**Competency Builders:**

Use heat elution to elute antibodies from red blood cells
Use freeze elution to elute antibodies from red blood cells
Use acid elution to elute antibodies from red blood cells

**Competency: Draw blood from donors**

**Competency Builders:**

Explain blood donor requirements
Perform therapeutic phlebotomies
Explain various physical criteria
Explain medical history criteria

**Competency: Operate blood bank**

**Competency Builders:**

Visibly inspect units of blood
Dispose of blood bags and patient samples
Store blood and blood products for transfusion
Investigate transfusion reactions
Investigate hemolytic diseases in newborn
Describe blood components
Describe the uses of blood components
Prepare blood for storage
Store blood
Perform quality control on all reagents
Record all quality control procedures
Check label to verify blood type
Identify patient specimen properly
Follow American Association of Blood Bank (AABB) protocols

# Unit: Immunology and Serology

**Competency: Use immunology and serology terminology**

**Competency Builders:**

Define terminology related to immunology and serology
Spell terminology related to immunology and serology

**Competency: Perform immunologic examination**

**Competency Builders:**

Explain the principle of immunologic examination
Identify antigen-antibody reaction
Describe the relationship of T and B cells to antibody production

**Competency: Test for syphilis**

**Competency Builders:**

Define syphilis
Describe the stages of infection
Perform different types of serological tests for syphilis

**Competency: Perform VDRL, RPR, and PCT tests**

**Competency Builders:**

Perform qualitative VDRL, RPR, and PCT tests
Perform quantitative VDRL, RPR, and PCT tests
Perform fundamentals of complement-fixation tests
List quality control procedures for all immunologic tests
Perform quality control

**Competency: Perform agglutination tests**

**Competency Builders:**

Perform febrile agglutination tests
Differentiate among Weil Felix, Widal, and febrile agglutination testing

**Competency: Perform immunologic and serologic procedures**

**Competency Builders:**

Explain theory of C-reactive protein (CRP)
Perform CRP
Explain theory of anti-Streptolysin screen (ASO) and titer
Perform ASO
Explain theory of heterophile agglutination
Perform heterophile quantitative with sheep cells, guinea pig, and horse serum absorption
Perform heterophile qualitative with latex agglutination or blood cell agglutination tests
Perform rheumatoid arthritis tests (e.g., latex agglutination)
Perform systemic lupus erythematosis (SLE or LE agglutination) tests
Perform red cell fragility tests
Perform anti-nuclear antibody tests
Perform antigen detection of organisms in spinal fluid (e.g., Directogen™ test and Bactogen™ test)
Perform fluorescent antibody procedures
Perform group typing of bacterial growth
Explain principles of test for radial immunodiffusion (RID)
Perform the test for RID
Perform serum pregnancy test (HCG)
Perform tests for hepatitis
Perform febrile agglutination tests
Perform monospot test

**Competency: Explain tests for other viruses**

**Competency Builders:**

Explain test for cytomegaloviris
Explain test for retrovirus
Explain test for Epstein-Barr virus
Explain test for acquired immune deficiency syndrome (AIDS)

# Unit: Bacteriology

**Competency: Use terminology related to bacteriology**

**Competency Builders:**

Define terms related to bacteriology
Spell terms related to bacteriology
Identify types of bacteria by shapes
Describe the growth curve of bacteria

**Competency: Identify types and uses of culture media**

**Competency Builders:**

Identify the different culture medias
List the uses of the different culture medias

**Competency: Culture specimens**

**Competency Builders:**

Select appropriate culture media
Use concentration methods for sputum specimens to be cultured for acid-fast bacilli
Culture sputums for acid-fast bacilli
Examine smears for acid-fast bacilli
Type cultures using type-specific typing sera
Perform proper plating techniques

**Competency: Prepare culture media**

**Competency Builders:**

Prepare blood agar, Mueller-Hinton, and broth culture media
Use additives (e.g., enrichments, inhibitors, indicators, salts, buffers) in preparing culture media
List the uses of culture media (i.e., bile esculin agar, bismuth sulfite [BS], blood agar, Bordet-Gengou, brilliant green agar, chocolate agar with V and X factors, chopped meat glucose broth, cornmeal agar, cystine tellurite blood agar, desoxycholate agar, desoxycholate citrate agar, eosin methylene blue [EMB], Flides enrichment agar, Loeffler's, Lowenstein Jensen [L-J], MacConkey)

**Competency: Stain smears**

**Competency Builders:**

Explain staining procedures (i.e., Gram's, hot and cold acid-fast, Giemsa and Wright's, Albert's, negative or relief, spore, capsule, flagella, India ink, fluorescent, and methylene blue)
Describe uses of different stains
Perform stains

**Competency: Perform differentiating tests**

**Competency Builders:**

Perform coagulase test
Perform bile exculin test
Perform bile solubility test
Perform catalese test
Perform oxidase test
Perform optochin disc test
Perform bacitracin disc test
Perform beta lactam disk test

**Competency: Identify gram-positive cocci**

**Competency Builders:**

Isolate gram-positive cocci
Identify gram-positive cocci
Differentiate one gram-positive cocci from another
Differentiate normal/pathologic flora

**Competency: Identify gram-positive bacilli**

**Competency Builders:**

Isolate gram-positive bacilli
Identify gram-positive bacilli
Differentiate one gram-positive bacilli from another
Differentiate normal/pathologic flora

**Competency: Identify gram-negative cocci**

**Competency Builders:**

Isolate gram-negative cocci
Identify gram-negative cocci
Differentiate one gram-negative cocci from another
Differentiate normal/pathologic flora

**Competency: Identify gram-negative enterobactereaceae**

**Competency Builders:**

Isolate gram-negative Enterobactereaceae
Identify gram-negative Enterobactereaceae
Differentiate genera and species
Differentiate normal from pathologic flora

**Competency: Identify gram-negative bacilli**

**Competency Builders:**

Isolate nonfermenting gram-negative bacilli and the so-called miscellaneous gram-negative bacilli (i.e., Pseudomonas, Bordetella, Hemophilis, Brucella, and Campylobacter)
Identify nonfermenting gram-negative bacilli and the so-called miscellaneous gram-negative bacilli
Differentiate nonfermenting gram-negative bacilli and the so-called miscellaneous gram-negative bacilli
Differentiate normal from pathologic flora

**Competency: Perform antimicrobial sensitivity testing**

**Competency Builders:**

Use Kirby-Bauer system
Use MIC system
Use automated system

**Competency: Use bacterial identification systems**

**Competency Builders:**

Describe systems for bacterial identification (i.e., API, enterotube, automated systems, biochemical, and carbohydrate systems)
Perform bacterial identification using biochemical and carbohydrate system
Perform group typing of bacterial growth
Perform antigen detection of organism in spinal fluid (e.g., Dimetogen™ test and Bactogen™ test)

**Competency: Culture specimens**

**Competency Builders:**

Culture specimens (e.g., blood urine, stool [feces], sputum, throat, spinal fluid, urethral/cervical)
Use concentration methods for sputum specimens to be cultured for acid-fast bacilli
Culture sputums for acid-fast bacilli
Examine smears for acid-fast bacilli
Type cultures using type-specific typing sera

**Competency: Perform routine mycology procedures**

**Competency Builders:**

Perform KOH preparation
Perform methylene blue staining
Perform lacto-phenol cotton blue staining
Perform culture using Sabaroud agar
Use germ tube
Use commeal agar
Perform India ink preparation

**Competency: Perform special tests**

**Competency Builders:**

Perform group A streptococci rapid enzyme immunoassay test (or other detection kits) from throat swabs
Perform group A streptococci cultures for beta hemolysis screening
Perform clostridium difficile toxin test

# Unit: Parasitology

**Competency: Use parasitology-related terminology**

**Competency Builders:**

Define terminology related to parasitology
Spell terminology related to parasitology
Identify types of parasites (i.e., protozoa, helminthes)
Describe types of parasites
Classify parasites

**Competency: Perform examinations for parasites**

**Competency Builders:**

Examine feces for parasites (i.e., macroscopic examination, microscopic direct saline and iodine preparations, and various concentration methods)
Examine blood, urine and other body fluids for parasites
Examine tissue for parasites
Perform direct method examination for intestinal parasites (i.e., protozoa, trematodes, cestodes, nematodes)
Perform concentration method examination for intestinal parasites

**Competency: Perform tests for blood parasites**

**Competency Builders:**

Perform test for malaria
Perform test for filaria
Perform test for trypanosomes

**Competency: Perform tests for fats and occult blood**

**Competency Builders:**

Prepare Sudan IV stain for fats
Examine stool for fats
Perform test for occult blood in stool

**Competency: Stain for ova and parasites**

**Competency Builders:**

Prepare permanent smears for ova and parasites
Stain permanent smears for ova and parasites using iron bematoxylin method
Stain permanent smears for ova and parasites using trichrome method
Describe the defining characteristics of the cryptosporidium species
Identify cryptosporidium
Stain cryptosporidium

# Unit: Urinalysis

**Competency: Use terminology related to urinalysis**

**Competency Builders:**

Define terminology related to urinalysis
Spell terminology related to urinalysis

**Competency: Identify properties of urine**

**Competency Builders:**

Explain the formation of urine
Describe the anatomy of the kidney
Identify the physical properties of urine
Identify the chemical properties of urine
Identify the microscopic structures found in urine

**Competency: Explain principles of urine tests**

**Competency Builders:**

Explain the role of specific gravity in urine tests
Explain the role of pH in urine tests
Explain the role of protein in urine tests
Explain the role of glucose in urine tests
Explain the role of ketones in urine tests
Explain the role of occult blood in urine tests
Explain the role of nitrate in urine tests
Explain the role of bilirubin in urine tests
Explain the role of urobilinogen in urine tests
Explain the role of leukocyte esterase in urine tests

**Competency: Perform special tests**

**Competency Builders:**

Perform Addis count
Perform Ehrlich's test for urobilinogen
Perform Fishberg concentration and dilution
Perform Fantus test for chloride
Perform Gerhardt's diacetic acid test, and Linderman's test for diacetic acid
Perform Gmelin's test, Harrison's test, Smith's test, and Ictotest™ (Ames) for bilirubin
Perform heat and acetic acid test and sulfosalicylic acid test for protein
Perform Heller's ring test for albumin
Perform Lang's nitroprusside test, Robert's test, and Rother's test for acetone
Perform Mosenthal's concentration test
Perform Sulkowitch test for calcium
Perform test for indican Obermeyer's
Perform Watson's test and the Watson-Schwartz test for porphyrins
Perform Bence Jones protein test
Perform sulfosalicylic acid test for protein
Perform test for acetone
Perform tests for reducing substances

**Competency: Identify cells found in urine**

**Competency Builders:**

Identify blood cells found in urine
Describe blood cells found in urine
Identify types of epithelial cells found in urine
Describe types of epithelial cells found in urine
Explain the cause of each type of cell appearing in urine

**Competency: Identify casts found in urine**

**Competency Builders:**

Describe casts found in urine
Describe cases found in urine
Explain how casts are formed
Explain where casts are formed
Describe the causes of each type of cast found in urine

**Competency: Identify foreign matter found in urine**

**Competency Builders:**

Describe types of pathological crystals found in urine
Identify mucus found in urine
Explain the significance of mucus found in urine
Identify parasites found in urine
Explain the significance of parasites found in urine
Identify spermatozoa in urine
Explain the significance of spermatozoa in urine
Identify bacteria found in urine
Explain the significance of bacteria found in urine
Identify cylindroids found in urine
Explain the significance of cylindroids in urine
Identify yeast found in urine
Explain the significance of yeast found in urine
Identify amorphous material found in urine
Explain the significance of amorphous material found in urine

# Unit: Hematology

**Competency: Use hematology terminology**

**Competency Builders:**

Define terminology related to hematology (e.g., erythrocytes, lymphopoieses)
Spell terminology related to hematology

**Competency: Demonstrate knowledge of erythrocytes**

**Competency Builders:**

Explain the life cycle and life span of erythrocytes
Explain the maturation series of an erythrocyte from its origin to its final destination in the peripheral blood stream
Explain the formation of bilirubin from the destruction of erythrocytes
Identify pathologies of erythrocytes (e.g., anemias)
Identify normal and abnormal values

**Competency: Perform erythrocyte tests**

**Competency Builders:**

Explain automated erythrocyte testing
Identify normal erythrocyte values
Perform erythrocyte counts (automated and manual)
Perform hemoglobin determinations
Perform macrohematocrit and microhematocrit determinations
Perform tests (e.g., mean corpuscular volume—MCV, corpuscular hemoglobin—MCH, and corpuscular hemoglobin concentration--MCHC) used in erythrocyte indices
Explain principles and uses of erythrocyte sedimentation rate (ESR)
Describe the types and purpose of Wintrobe, Westigren, and Zeta sedimentation rates
Perform each ESR procedure
Perform mathematical calculations for MCV, MCH, and MCHC
Perform reticulocyte counts
perform sickle cell tests
Perform fetal hemoglobin test

**Competency: Demonstrate knowledge of granulocytes, lymphocytes, and monocytes**

**Competency Builders:**

Explain the maturation series of the neutrophilic granulocytes
Explain the maturation series of the granulocytic eosinophils and basophils
Explain the maturation series of the nongranulocytes-lymphocytes
Explain the maturation series of the nongranulocytes-monocytes
Explain the maturation series of the thrombocytes (i.e., platelets)
Explain the origin and function of granulocytes, lymphocytes, and monocytes
Identify normal percentages of granulocytes, lymphocytes, monocytes, and thrombocytes
Identify pathologies of white blood cells (e.g., leukemia)
Identify pathologies of thrombocytes
Identify normal and abnormal values

**Competency: Prepare blood smear stains**

**Competency Builders:**

Make a blood film/smear
Use leukocyte alkaline phosphatase stain
Stain blood films using Wright's and Giemsa's stains
Stain thick smear for malaria
Make cytospin slide
Use Hansel stains on nasal secretions for eosinophiles
Stain bone marrow smears

**Competency: Perform blood counts and tests**

**Competency Builders:**

Identify functions and elements of blood
Describe the dimensions of the counting chamber
Calculate leukocyte and erythrocyte counts using counting chamber
Perform leukocyte counts
Perform thrombocyte counts
Perform white blood cell differential counts
Perform leukocyte counts on very low very high counts using the manual pipette method
Correct leukocyte counts in the presence of nucleated red blood cells
Describe principles of automated cell counters (e.g., Coulter principle and laser principle)
Perform reticulocyte counts
Perform direct eosinophile counts
Perform sickle cell tests
Perform fetal hemoglobin test

**Competency: Perform body fluid counts**

**Competency Builders:**

Perform thoracentesis fluid count
Perform pleural fluid counts
Perform spinal fluid counts
Perform joint fluid counts for cells and crystals

**Competency: Perform sperm counts**

**Competency Builders:**

Define motility
Describe morphological abnormalities
Analyze appearance
Analyze consistency

**Competency: Perform coagulation and hemostasis tests**

**Competency Builders:**

Describe principle of hemostasis
Explain the principle of prothrombin time (PT) test
Identify coagulation factors tested for when performing prothrombin time (PT)
Perform PT test
Explain the principle of partial thromboplastin time (PTT or APTT) test
Identify coagulation factors by Roman numeral and common name
Identify coagulation factors tested for when PTT test
Perform PTT or APTT test
Explain the principle of capillary bleeding and clotting time tests
Perform capillary bleeding and clotting time tests
Identify uses of Lee White coagulation time test
Perform Lee White coagulation time test
Perform Duke and Ivy bleeding time test
Identify uses of template bleeding time test
Perform template bleeding time test
Explain the principle of fibrinogen test
Perform fibrinogen test
Explain the principles of fibrin degradation test
Perform fibrin degradation product (FDP) and fibrin split product (FSP)
Explain the principle of fibrin monomere test
Perform fibrin monomere test
Identify uses of clot retraction test
Perform clot retraction test
Perform factor assays

**Competency: Maintain related instruments and equipment**

**Competency Builders:**

Demonstrate proper use of microscope and centrifuge
Demonstrate proper use of glassware and pipettes
Demonstrate proper use of automated coagulation and hematology equipment
Clean related instruments and equipment
Store related instruments and equipment
Report needed repairs

**Competency: Perform quality control**

**Competency Builders:**

Check temperature of coagulation instruments
Check temperature of hematology instruments
Check reagents of coagulation instruments
Check reagents of hematology instruments
Check maintenance of coagulation instruments
Check maintenance of hematology instruments
Perform manufacturer-specific quality control test procedures
Label reagents
Inspect reagents
Prepare reagents

# Unit: Phlebotomy

**Competency: Demonstrate knowledge of health care institutions and departments in which a phlebotomist functions**

**Competency Builders:**

Identify the health care providers in hospitals and clinics
Describe the organizational structure of the clinical laboratory department
Discuss the roles of clinical laboratory personnel
Discuss the qualifications for clinical laboratory personnel
List the types of laboratory procedures run in the various sections of the clinical laboratory department
Describe the role of the clinical laboratory in assessing body functions

**Competency: Identify the phlebotomist's role as a member of a health care team**

**Competency Builders:**

Describe the various facilities and departments in which the phlebotomist interacts
Describe the major functions of the various facilities and departments in which the phlebotomist interacts

**Competency: Describe collection equipment, reagents, and interfering factors in blood collection**

**Competency Builders:**

Describe the types of patient specimens that are analyzed in the clinical laboratory
Describe the phlebotomist's role in collecting and transporting these specimens to the laboratory
List the supplies that should be carried on a phlebotomist's tray when collecting microspecimens
Describe substances that can interfere in clinical analysis of blood constituents
Describe procedures used to avoid interference in clinical analysis of blood constituents
List the types of equipment needed to perform a venipuncture
Explain the special precautions employed when collecting blood from a newborn infant
Explain the types of equipment needed to collect blood from a newborn infant
List the equipment needed to perform a heel stick collection on an infant

**Competency: Describe proper blood collection procedure, including handling complications that may arise**

**Competency Builders:**

Discuss the legal and ethical importance of proper patient/sample identification
Identify potential sites for venipuncture
Identify potential sites for capillary puncture
List what effects tourniquet, hand squeezing, and heating pads have on skin puncture
List what effects tourniquet, hand squeezing, and heating pads have on venipuncture
Establish a recollection policy
Identify criteria for rejection of a patient sample for testing
Describe why some sites are more difficult to draw blood from then others
Identify which sites are more difficult to draw blood from
Name frequent causes of phlebotomy complications
Explain frequent causes of phlebotomy complications

**Competency: Demonstrate knowledge of the disease process route of infection, infection control, and equipment safety**

**Competency Builders:**

Identify the potential routes of infection
Identify the methods for infection prevention
Perform protocol for obtaining a sterile site

**Competency: Explain the protocol for communication, transport, and processing specimens**

**Competency Builders:**

Explain the correct procedure for complying with the request for collection of routine specimens
Explain the correct procedure for complying with the request for collection of special specimens
Explain the rationale for the various methods of transport
Explain the procedure for processing specimens for routine testing from specimen labeling to result reporting manual or computer systems
Explain the reasons for processing procedures
Identify essential information that should be on the laboratory requisition or computer order entry
Describe the significance of time constraints for specimen delivery to the analytical area
Describe schedule constraints imposed by timed operational factors in the laboratory
Identify the precautions applicable to verbal test ordering and reporting
Evaluate results of quality control techniques in specimen collection
Implement corrective quality control techniques where indicate

**Competency: Apply quality control and safety procedures**

**Competency Builders:**

Describe a system for monitoring quality assurance in the collection of blood specimens
Identify policies and procedures used in the clinical laboratory to assure quality in the obtaining of blood specimens
Design a strategy to implement a quality assurance program in the specimen collection section of the clinical laboratory
Describe safety measures that should be followed at all times by the phlebotomist when collecting blood specimens
Evaluate the electrical, radiation, and fire safety procedures used in the phlebotomy clinical laboratory setting

**Competency: Describe basic concepts of communications, stress management, professional behavior, and the legal implications of the health-related work environment**

**Competency Builders:**

Describe the protocol for preparing a patient for laboratory testing
Describe the preferred techniques for dealing with family and visitors during the blood specimen collection
Explain intra-laboratory communications techniques
Explain inter-laboratory communications techniques